INDEX TO ADVERTISEMENTS

In the "Canadian Architect and Builder."

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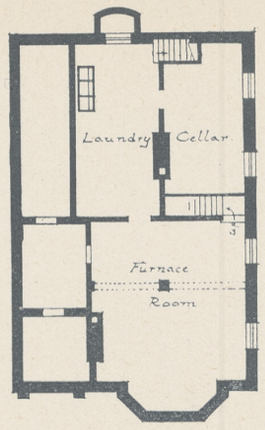
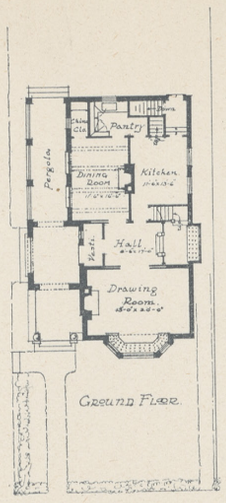
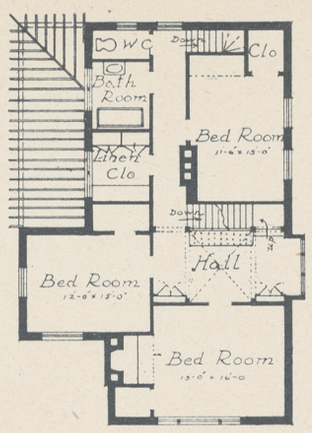
APRIL, 1903

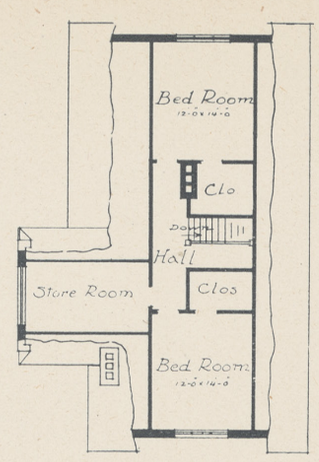


BASEMENT PLAN.





FIRST FLOOR.



ATTIC FLOOR

SOUTH ELEVATION

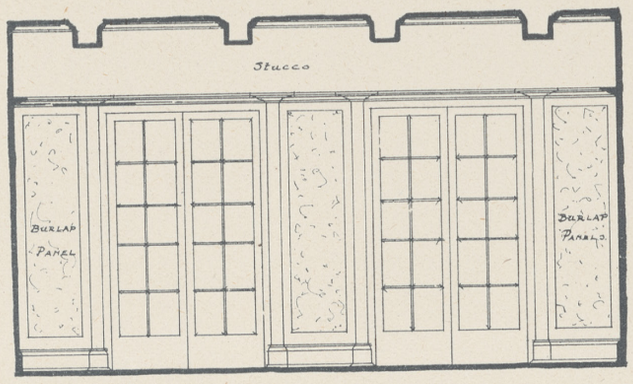
EAST ELEVATION

"C. A. & B." COMPETITION FOR A TOWN OR SUBURBAN HOUSE.

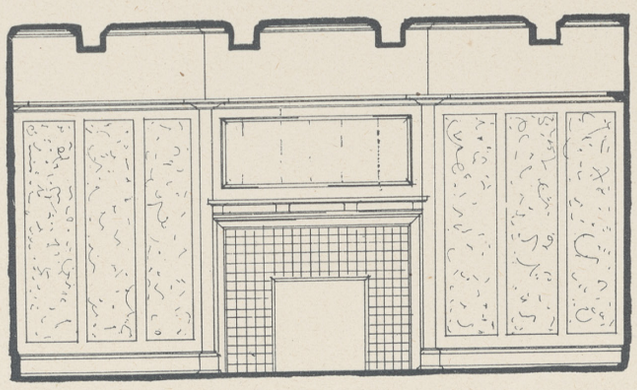
DESIGN SUBMITTED BY "T SQUARE, JR." MR. CLARENCE THETFORD). AWARDED HONORABLE MENTION.

DESIGN FOR A SUBURBAN RESIDENCE BY T-SQUARE JR.

JAN. 1903. Scale - 1 Inch = 2 Feet.



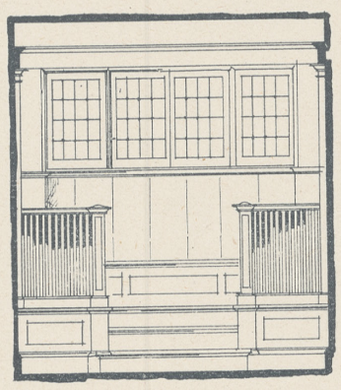
SOUTH SIDE OF DINING ROOM



NORTH SIDE OF DINING ROOM

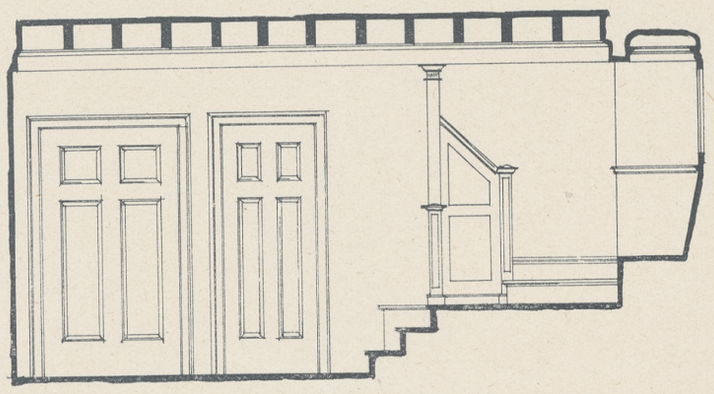
Pine teeth, Burlap panels, Wood Beams

Think it might be as well to leave out Fireplace in room of this size, space could then be used for Sideboard.

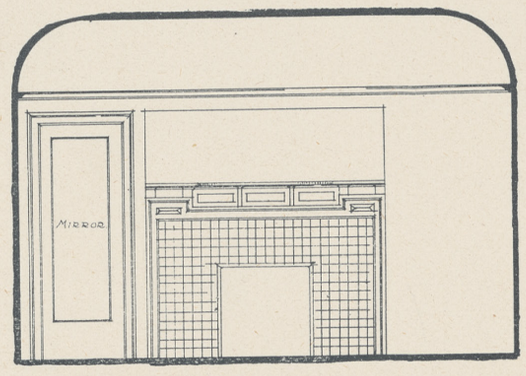


NORTH ELEVATION OF HALL

Sheeted ceiling, false joists showing -

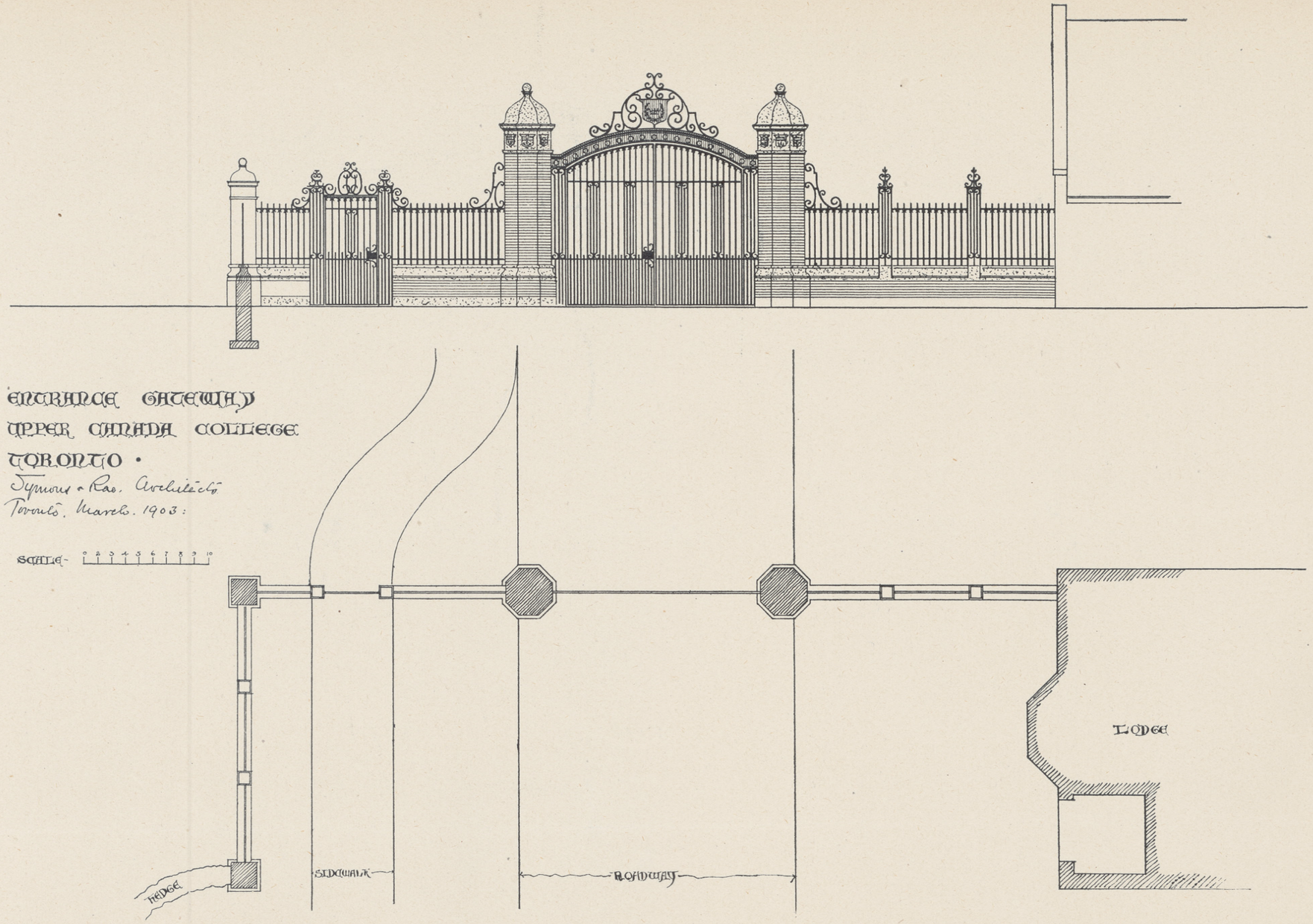


SECTION thro' HALL



FIREPLACE FRONT BEDROOM.

CANADIAN ARCHITECT AND BUILDER.



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SYMONS & RAE, ARCHITECTS.

SUPPLEMENT TO
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APRIL, 1903

HOUSE IN PARK ROAD, TORONTO.

BURKE & HORWOOD, ARCHITECTS.

SUPPLEMENT TO
CANADIAN ARCHITECT AND BUILDER
APRIL, 1908

The Canadian Architect and Builder

VOL. XVI.—NO. 184. APRIL, 1903.

ILLUSTRATIONS ON SHEETS.

C. A. & B. Students' Competition for a Town or Suburban House.—Design submitted by "T Square, Jr." (Mr. Clarence Thetford), Awarded Honorable mention.
House in Park Road, Toronto.—Burke & Horwood, Architects.
Entrance Gateway, Upper Canada College, Toronto—Symons & Rae, Architects.

ADDITIONAL ILLUSTRATIONS IN ARCHITECTS' EDITION.

Detail, Certosa di Pavia, Italy.
Old Building at Chinon, France.

ILLUSTRATIONS IN TEXT.

Buildings under construction for the Louisiana Purchase Exposition, St. Louis, Mo.
Decorative Panel for a Dining Room.

CONTENTS

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" S. H. TOWNSEND, " "
" FREDERICK G. TODD, Landscape Architect, Montreal
" W. H. ELLIOTT, Toronto.
" J. C. B. HORWOOD, Architect, Toronto.
" A. F. DUNLOP, R.C.A., Architect, Montreal.
" FRED. T. HODGSON, Architect, Collingwood, Ont.

Putting in Foundations in Winter.

For several years in Toronto there has been but a very short gap between one building season and another. In fact, if account is taken of the new structures on which inside work is in progress throughout the winter, there may be said to be no gap at all. The present winter, which has been a favorable one for architects and builders, witnessed the putting in of foundations for new buildings during January and the early part of February. The method adopted to prevent frost from getting in below the foundations is to cover the work when not in process of construction, with manure. It is admitted, however, that there is considerable risk attending the practice—the success of which largely depends on securing a week or ten days of favorable weather. We have been told of instances in which frost having got below the footings of a cellar pier, caused the architect trouble from settlement throughout the whole progress of the work.

Building Failures.

The Montreal papers have already recorded this year several instances in which buildings in that city have collapsed. Such cases have been altogether too frequent in Montreal during the last three or four years. In some instances, as in the case of a biscuit factory on Delorimer Avenue last month, the collapse came while the buildiag was in process of construction. In others, the buildings had been standing for years, and probably succumbed to strains imposed on them which they were never intended to bear. In the case of the uncompleted buildings the explanation is not so clear. Their collapse would seem to be due either to faulty materials or construction or to carelessness on the part of contractors in failing to properly support the unfinished walls. Whatever the cause, greater care should be exercised lest human life be sacrificed, which through good fortune rather than good management, has not yet occurred.

Slip-Shod Tendering.

An inspection of a batch of tenders, even for an ordinary house, will show the necessity for a better all-round education and in particular a better business training, for contractors. It is evident that many contractors do not study and grasp the meaning of the specifications on which their tenders are based. The specifications may in the most explicit manner require the contractor to state what deductions in price he will make if certain parts of the work are omitted, but as a rule he pays no attention whatever to the requirement and it is impossible for the architect to know whether his tender is designed to

include the whole work or not. Then there is the wide variation in tenders to which previous reference has been made. Tenders for the carpentry work of a house of moderate price are found to be as much as one thousand dollars apart, and even in so small an item as the electric wiring, there is a difference of fifty dollars between one offer and another. There would seem to be something radically wrong either with the methods or morals of contractors when such wide differences as these occur, and in view of such apparently hap-hazard figuring it is surprising that the percentage of failures among contractors is not greater than it is.

The Designing of Commercial Buildings.

The Confederation Life Building, Toronto, is serving as an example of the unsuitability of gothic design for commercial buildings. In order to secure an adequate revenue the owners were compelled two or three years ago to have remodelled the western front, to serve as banking premises. With the same end in view it is now proposed to redesign and reconstruct the upper part of the Yonge and Richmond street fronts as far back as the main tower and to add three stories to the height. When this is done the revenue from this part of the building will probably be more than double what could have been obtained before. The alterations will represent a large expenditure, the greater part of which might have been saved if the purpose of the building and its revenue producing value had received proper consideration by the designer and those responsible for the selection of this particular design from among a large number submitted by architects in competition. Architects, owners and judges in architectural competitions should alike be impressed by the lesson which the history of this building teaches—that a plan for a building is successful in so far as the requirements are properly considered and provided for. Following this in order of importance should come the effort to make the building pleasing in appearance, which with a skilled designer is always possible.

Dominion Exhibition.

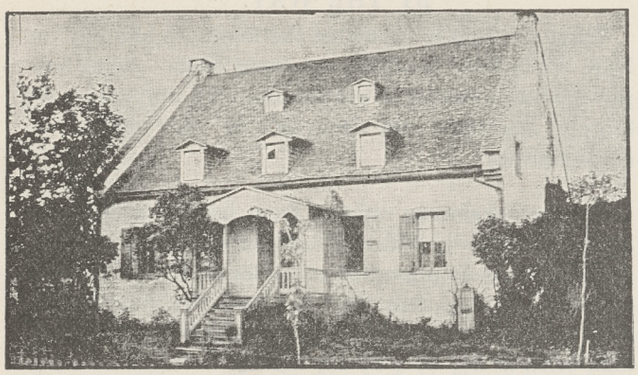
Assisted by a grant of $50,000 from the Federal Government, it has been decided to hold a Dominion Exhibition in Toronto this year. For some time we have advocated this project, and are therefore gratified to learn that it has assumed definite form. The question arises however, whether four or five months is sufficient time for the preparations to be made on a sufficiently ample and complete scale. It is stated that the Industrial Exhibition Association have already been at work on the enterprise for several months. If this is the case, no doubt many of the arrangements are already well under way. Every patriotic Canadian should lend his assistance to make this Exhibition truly representative of the resources of the entire Dominion. The hearty co-operation of the local governments, commercial bodies and leading men of the various provinces forming the Confederation, is essential to success. The railway and steamboat companies can also greatly assist by granting such low transportation rates as will encourage visitors to attend from every part of the country. It is to be hoped that means will be found and steps taken to bring before the visitors to this Exhibition the improvements in design, materials and methods which have marked the progress of the building industry in this country, especially during the last decade.

An Important Decision

Consternation has been caused in the ranks of the labor unions in England by the recent decision of the Superior Courts, condemning the Amalgamated Society of Railway Servants to pay $115,000 to the Taff Vale Railway Co. as compensation for damage sustained by the company by reason of the intimidation of their employees by the Society during a strike. In this case, as in that of the journeymen plumbers in Toronto last year, the strikers did not hesitate when it suited their purpose to violate their agreement with their employers by quitting work without giving fourteen days notice as required by the terms of their engagement. The secretary of the Society has admitted that had the Society lived up to its agreement, the strike could not have succeeded, as the company would have been able to get the required help. When the company were granted an injunction preventing interference by the strikers with their workmen, the society capitulated. Then the company took the agressive and sued the society for $150,000 damages, and as stated, were awarded $115,000. The situation in England now is that men still have the right to organize, but they may not strike until they have given the legal notice, and when they have quit their employment they must not interfere with the men who take their places. If they do they are liable in damages, and as the present decision shows, substantial ones at that. An effort is now being made to have the law changed in such a way as to relieve the Unions of the responsibility placed on them by the courts.

Wired Glass.

The Chief Engineer of the New York Fire Department has recently expressed high appreciation of wired glass as an efficient protection from fire. The fire-resisting qualities of this material are now generally recognized. According to the American Architect, however, except when fire is present, it has undesirable, even dangerous qualities. This journal cites as proof the South Terminal Station in Boston. In the windows that face east, south, and west, and in the thousands of feet of pent-roof over the street sidewalks, there is said to be hardly a sheet of the glass that is not cracked and shivered into a dozen or a hundred different pieces of glass, just now held in place by the embedded wire and the unequal planes of fracture of the glass itself. But where cracks are, there moisture and acid-gases can penetrate, and when corrosion has done its work on the wire there is likely to be many a repetition, less innocent, too, of the incident which attended President Roosevelt's reception in Boston a few weeks ago, when a sizable piece of this shattered wire-glass fell onto the platform not far from the President. Meanwhile before the time comes when falls of heavy pieces may be looked for, much of this shattering of the glass is already accompanied by the flying of fine splinters of glass. As fracture occurs least often on the side, and most frequently where the windows face the rising sun, it is evident that the manufacturers must give further study to the qualities of radiant heat before wire-glass can be held to be a perfectly safe material to use.



TOM MOORE HOUSE AT STE. ANNE, NEAR MONTREAL.

HIGH BUILDING.

It is satisfactory for the rest of the world that New York should proceed as fast as it can to the logical extreme in high building. What the rest of the world wants to know is, what will it come to? What is the limit; and what are going to be the consequences of building up to the limit?

The limit in height is practically in sight. Passenger elevators, which were the generating factor in these buildings, are also fixing their limitations. Accessibility to the street level is what is required for an office; and, when buildings are so high that time is wasted in going and coming in the elevator, the offices in the highest floors will not rent sufficiently well. The device of express elevators gets over the difficulty to some extent, but in the first place there is a limit to the percentage of floor space that can be given up to the elevator shafts, if the building is to pay; and in the second place there is a speed limit in elevators. What is known as a "nausea limit" is recognized; anything above this rate of speed is found to be uncomfortable—at least for landsmen. For men this rate is said to be 720 feet a minute; for women not more than 600 feet; and the descent must be much less rapid than this. Anything faster than 400 feet a minute going down, is distressing; so that about 600 feet per minute up and 400 feet per minute down is the maximum for an express elevator. The floor to floor elevator is still further reduced in speed, to enable the operator to make a prompt stop. If, with higher speed he bobs up and down at every floor—a consequence partly of human weakness and partly of the elasticity of steel rope—there is no ultimate gain in speed and considerable waste of power. Limiting calculations are often upset by new inventions; but, where the human body is the measure, there is a standard which may be relied on not to change. It is difficult to conceive of more rapid motion up or down for human beings than the present nausea limit, or of more abrupt stops at this rate of speed without great discomfort to the occupants of the car; and we may therefore accept as a scientific datum the present opinion of engineers in New York, that the limit of business buildings due to the limited speed of elevators, is between twenty-five and thirty storeys.

This may be the limit of height, but how to fix the limit of continuity. A sky scraper at intervals is a gain in every way; it gives well lighted, airy, and quiet offices; and it makes the street picturesque. A row of sky scrapers converts the street into a box canyon of unwholesome gloom; but it is not to be compared to the gloom and unwholesomeness within the buildings themselves. This condition of affairs is rapidly approaching in New York. There is what almost amounts to a skyscraper war going on. The early tall buildings in which, with more confidence than judgment, the party walls were filled with windows, are now in an awkward position. Skyscrapers are rising beside skyscrapers and blocking up whole walls of windows. Rooms which, when the buildings were erected, had the winter sun and the summer breeze, are now sealed up in darkness forever; and the sanitary consequences are beginning to cause alarm. In the lower rooms, in a street of continuous sky-scrapers, there is no light anyway; and, if darkness is to invade the upper storeys too, the unwholesomeness of the overcrowding in these expensive offices is going to be as bad as that in the poor tenements, which so much effort has been made to stop. At a recent meeting of the Municipal Art Society, a prominent speaker said:

"I read in my newspaper to-day of the benevolent project to build a great hospital for consumptives, the victims of tuberculosis; where they may have air and sunlight. And in the same paper I read of plans for a thirty story building. What are we trying to do? What do we mean by putting up these horrible structures, to the lower floors of which no light can ever penetrate? . . . We build hospitals for the poor consumptive, and then we turn around and erect skyscraping structures where consumption may breed, so that we shall not lack for patients."

It is not merely the darkness, but the crowding of the streets and buildings which is a menace to health and safety. This same speaker calculates that "when Broadway is lined with these structures, there won't be room for the tenants, unless they are packed horizontally thirty feet thick." It is not hard to believe that this calculation, if checked, will be found to be not far from the truth. It was calculated at the beginning of the year that the buildings of nine storeys or more in the lower part of Manhattan Island, below Leonard street—that is to say only in the tall building district proper—have added the floor area above their fifth storeys, 180 acres of area to the island. The estimated cost of these buildings was $33,000,000. There is said to be $10,000,000 worth of buildings of the same sort in process of erection now, so that, as area may be presumed to compare consistently with price, when these are completed, which will not be long at the rate these buildings go up now, there will be added to this small district 240 acres of standing room above the streets; but there will be only the same old streets to walk in, and these more than ever filled with vehicles from other parts. The Broad Exchange Building has a floor area of 12½ acres and a normal population of 4,000 persons. Apply this rate of population to the 60 acres or so of floor area (above the fifth storey) which are now being constructed and it will appear that this portion of New York is about to receive an increase in daily population of at least 20,000 souls. If they only were souls; if, "in going from place to place," they need not "pass through the intermediate space," it would be all right; but 20,000 hustling bodies in streets where one has already, in going to keep an appointment, to allow time for hindered progress—it is nearing the limit.

The cure is exhibited in a trio of buildings on Broadway; a two-storey bank between two sky-scrapers. This is, at any rate, the solution of the light and air problem. It would also solve the problem in design. The two storeys of the bank run with the two storeys

which constitute the base of the tall building; the bank's cornice with the top member of this base; their columns and arcades are fairly comparable. Here is dignity without monotony, picturesqueness without extravagance, height without gloom; every gain without any loss except loss of space, and loss of space is gain in this case.

What other cities have to learn from New York is to put the limit out of the question by taking precautions in time. The limit is not practical. It is not worth while to shut numbers of people in darkness, for the sake of getting them all together, only to find that it would be better if there were not quite so many together. The limit of elevators, and the limit of traffic and transit in the streets, seem to point to the same moderation in close building which is indicated by the requirements of planning for light. It is no extreme to advocate the attainment of this moderation by municipal regulation, requiring that every tall building shall be isolated above such height as usually forms the base storeys of a sky-scraper. This allows for such an arrangement as is suggested by the bank on Broadway between two such buildings. It would make a satisfactory street effect if the cornice at this height were continuous and the sky line above broken at intervals, more or less regular, by buildings more or less tall.

A way to bring this about would be to require every high builder to isolate his upper storeys by the purchase of land sufficient for the purpose. This would not be tyrannical legislation. If any criticism is to be made of it, it might be called grandmotherly legislation; for it is looking after the interests of the high builder himself to compel him to guard the value of his building in this way. It is not however entirely grandmotherly, for the interests of the public are also guarded in matters for which it is certainly within the province of the City Fathers to care, viz., light and air and reasonable density of population. There is also plenty of precedent, in cities which owe part of their success to regulations of this kind, for requiring that the low part of the building shall have for æsthetic considerations, a cornice line of a fixed height.

W. A. LANGTON.

DECORATIVE PANEL FOR A DINING ROOM—G. A. REID, R. C. A.

Messrs. King and Bannigan, of Boston, are reported to have purchased a large plaster quarry at Hillsboro, Albert county, N. B., and to be making arrangements to open up the work and to prosecute it in a vigorous manner.

The Lake Manitoba Quarry and Transportation Co. has been formed to develop extensive deposits of excellent building stone at the Lake Manitoba Narrows.

BY THE WAY.

There are said to be within the limits of the city of New York two hundred thousand inner rooms unprovided with means of ventilation. To this cause is largely attributed the increase in the number of consumptives.

× × ×

The inconvenience arising from lack of uniformity in size of bricks is evidently not confined to Canada. A petition has been presented to the legislature of Massachusetts praying that the standard for face bricks shall be fixed at 8⅜ by 4¼ by 2¼ inches and for common brick at 8¼ by 4 by 2¼ inches.

× × ×

Recent excavations in the far east have revealed the fact that the Jerry builder had to be reckoned with one thousand years before the time of Moses. The following has been found among other enactments of a Babylonian ruler of that period:—"If a builder build a house and finish it, but does not make it solid, and if then the house fall and kill the owner, that builder shall be put to death. If it strikes the owner's son dead, then the son of the builder shall be put to death".

× × ×

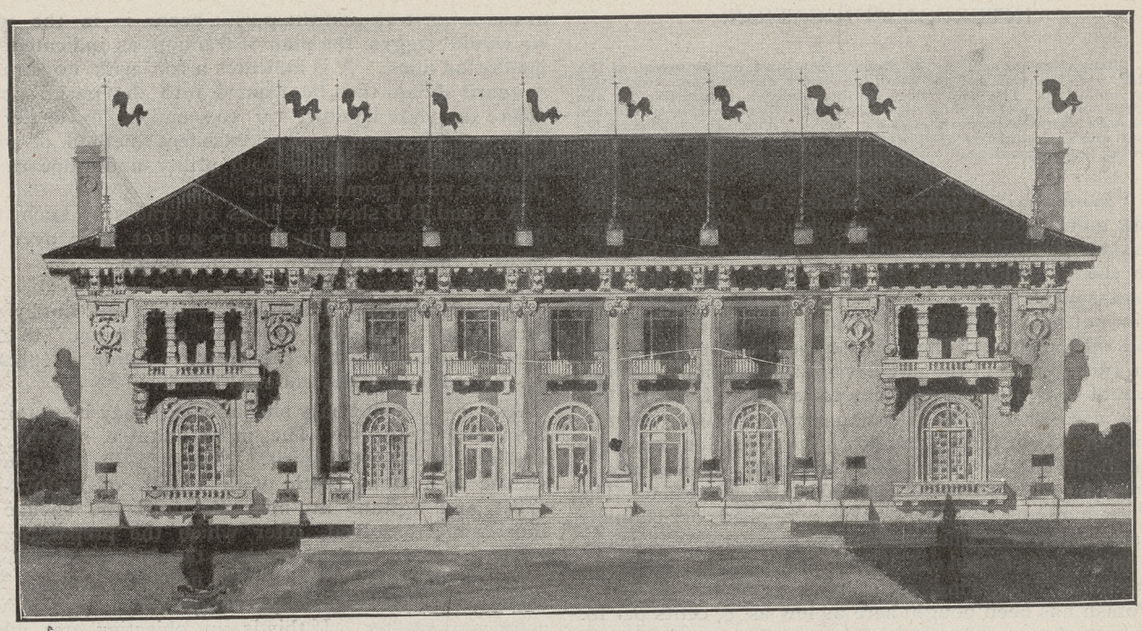
The Deputy Chairman of the Liverpool Corporation Housing Committee thinks he has solved the problem of the cheap and substantial construction of dwellings for the dispossessed slum population. He proposes to use very large slabs of concrete made from refuse-destructor and clinker cement, hoisted into position and bolted together. A quicker and therefore cheaper method than this would be the plan attributed to Thomas A. Edison of pouring the concrete into a mould of the desired form.

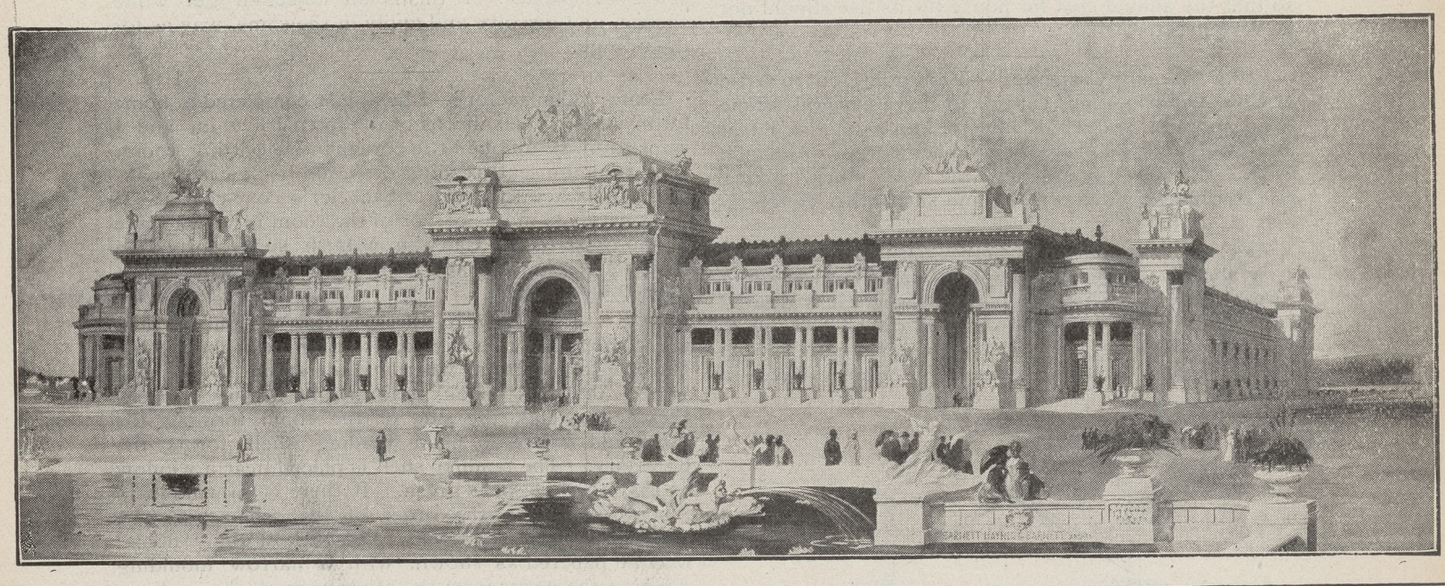
GLASS-FACED BRICK.

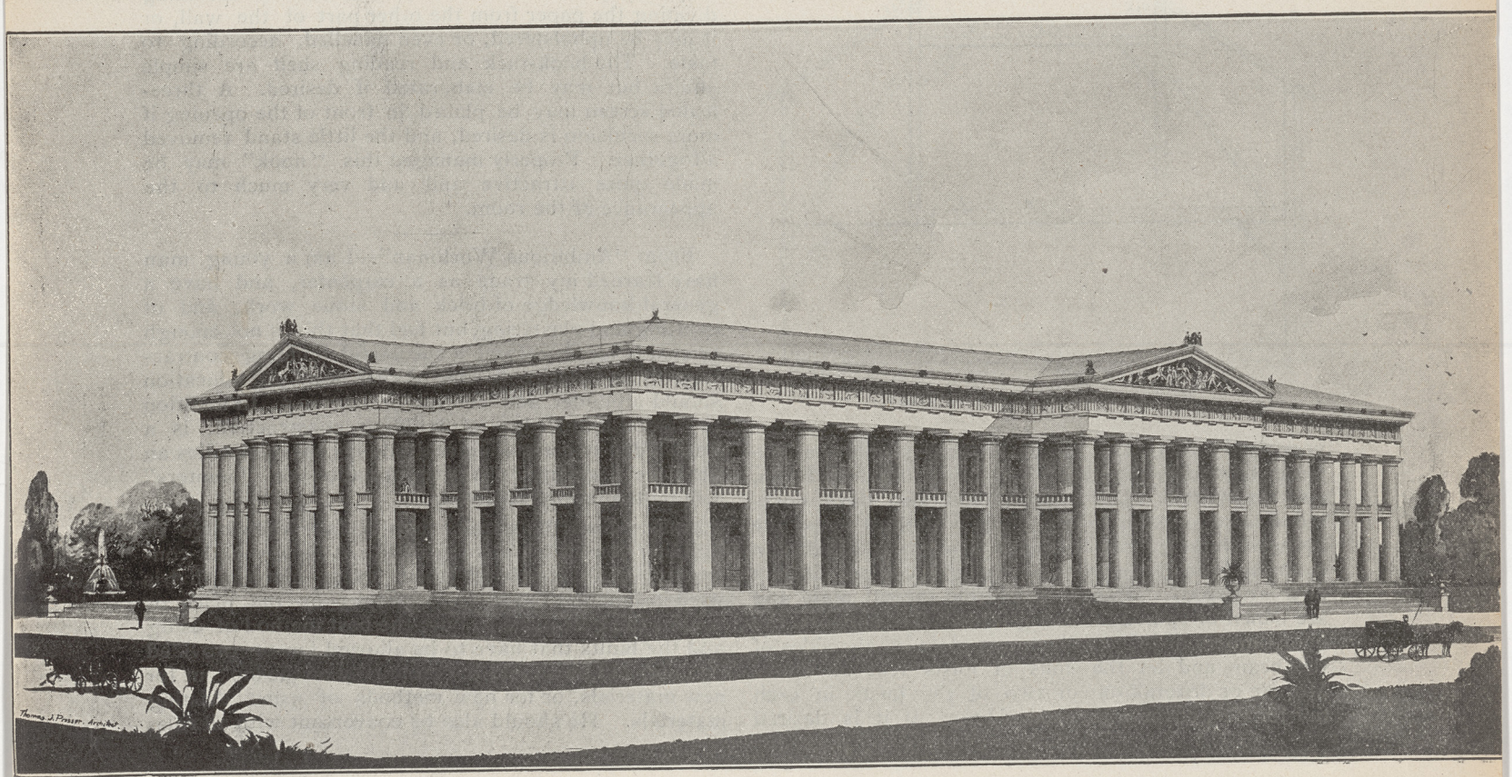
The Cleveland Leader says that a new company has been organized lately to manufacture glass-faced brick. A number of prominent Cleveland men are financially interested in the project and the concern is looking for a factory site of from three to five acres.

The new brick is another of the great variety of concrete building material now being manufactured. A glass plate is laid in the bottom of a mold, and the concrete mixture is poured in on top of the glass. The concrete hardens on the glass, thus forming a brick or building block with a very brilliant exterior.

This kind of brick is for use in such places as courts and light wells in large buildings, where the glass becomes a reflector, and on account of its smooth surface does not become soiled easily, and is readily washed. The new process will yield a product similar to enamel brick.







BUILDINGS UNDER CONSTRUCTION FOR THE LOUISIANA PURCHASE EXPOSITION, ST. LOUIS, MO.

No. 1. Travellers' Protective Association Building. No. 2. Liberal Arts Building. No 3. Fraternal Building.

INTERCOMMUNICATION.

Communications sent to this department must be addressed to the editor with the name and address of the sender attached not necessarily for publication. The editor does not hold himself responsible for the expressions or opinions of correspondents, but will, nevertheless, endeavor to secure correct replies to queries sent in. We do not guarantee answers to all queries neither do we undertake to answer questions in issue following their appearance.]

"Manitoba," Winnipeg writes: In your issue for this month "City Builder" complains of smells from the drain. I think he will find this comes from the inlet to the so called fresh air pipe outside, and does not necessarily mean any defect in the plumbing work. Let him put his nose in the fresh air inlet whilst some one lets off a charge of the water closet and I think he will find an outrush of the offensive gas complained of which would show the house drains to be foul. Let him then put a teaspoonful of "Permanganate Potash" crystals into the closet tank, flush down same once or twice and in about half an hour test the fresh air inlet again, when he will find the outrushed air to be sweet. The Permanganate Potash should be applied occasionally and I know that this has remedied several bad cases. Stinking gas forced out of fresh air inlet will blow into the house when windows are open. The Permanganate Potash has been bought here as low as 35 cents per lb. so that the annual cost for house for its use should not be very great.

From "Young Carpenter"—I am going out to settle in New Ontario, and expect to have several frame barns to build, and would like to know of the latest improved methods of framing timber barns. A sketch of an end "bent" would help me very much, giving size of timbers, pitch of roof, and such other details as may be useful?

ANS.:—The elevation of timber barn shown in Fig. 1, is about as good an example of frame barn building as we know of. This plan is useful where it is desired to have the lower floor or ground all clear, for example, for a wagon-house. The plan also serves quite as well as under other circumstances. The frame makes a

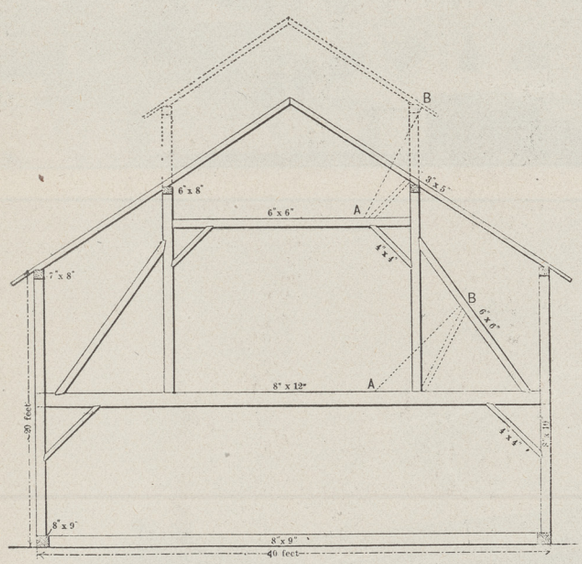


FIG. 1.—END OF A TIMBER BARN.

very rigid structure. The purlin post should be centered, tennoned, dovetailed and keyed into the beam, also drawbored. The beam should also have dovetailed tennons keyed into the post with drawbores, the frame without guards or guards either 3 or 4 inches in from the base of the post, according as you use either 3 or 4 inch studs. These extend from the sill plate and are nailed or spiked to the guards. To support the floor timbers or joists spike a 2x4 piece on the sides of the beam and let the ends of joists rest on these. Mortise or dovetail one or two of the joists in each tier for ties, cover with good siding. If it is desired to use a hay-fork and the purlin beam is in the way we would suggest the plan of framing as indicated by the dotted lines. A B indicates a rod with no strain. A guard should then be framed into the purlin post, where the plate is now, for top end of lower tier of rafters. This plan gives an excellent method of ventilation, and, is better in both utility and appearance than the usual gambrel roof.

A A and B B show the lines of braces if such are deemed necessary. The barn is 40 feet wide over all. Sizes of timbers are shown on the sketch.

From "Amateur Decorator"—Will you kindly inform me as to the kind of "gum" or "shellac" that is used by plasterers for preventing suction in plaster work, and how is the material dissolved?

ANS.:—Use ordinary shellac which may be obtained from any druggist. The most suitable solvent for shellac is methylated spirit. Place 1½ lb. of orange shellac in a stone bottle with 1 gal. of methylated spirit and agitate at intervals until the shellac is thoroughly dissolved, after which the preparation is ready for use, and must be stored in an air-tight vessel; apply quickly with a fine-hair brush. The cheapest shellac is a deep orange color, and it will color your plaster. If this is an objection get white shellac, and dissolve and apply in the same way as for the orange.

From "Contractor"—I have just completed a home for myself, in the suburbs of the town I live in, and I want to finish up one little corner in my sitting room, with a lounge seat, reading desk and book case, making the whole into a sort of bachelor's cosy-corner. It must be made in one corner of the room in which there are no objections. Can you publish some sort of a design suitable to what I require; if so I will appreciate it very much?

ANS.:—In answer to this request we publish the illustration shown in Fig. 2, as being near about what is asked for, so far as we can understand it. It will be seen that this "nook" is formed by having a book-rack at one end, the side of the room forming the other end where a plain reading shelf forms the boundary. The reading shelf is placed near a window so that ample light is given. If there is no window in this position then the order of the scheme may be reversed to suit conditions. The back of the "nook" may be papered as shown, with a narrow moulding dividing the paper from the other part of the wall, or it may be upholstered, or even panelled, according to taste. The book-rack and reading shelf are simple affairs but may be elaborated if desired. A three-leafed screen may be placed in front of the opening if more seculsion is desired, and the little stand removed altogether. Properly managed this "nook" may be made quite attractive and add very much to the appearance of the room.

From "Ambitious Workman"—I am a young man have learned my trade as a carpenter, and have a general knowledge of brick and stone work, and of painting and plastering, but feel that this is not enough to enable me to become a successful building contractor, which I desire to be. What kind of education should a builder and contractor receive? In addition to a good knowledge of building construction, is a knowledge of estimating and taking out quantities an absolute necessity? Any information or "pointers" will be thankfully received.

ANS.:—Something more than a fair knowledge of building construction is required. A builder and contractor should know all about every material that is used in building, such, for example, as the place or origin, the best place to buy, the best method of using and the faults that have to be allowed for or provided against; and he should be continually on the lookout for new materials, or for new methods of using existing materials. He should also be conversant with all rules

of arithmetic, with algebra up to simple quadratic equations, and geometry, and be able to calculate many things mentally. Land surveying is desirable so that buildings may be set out with facility, and quantity surveying is an absolute necessity. These two subjects can either be acquired under a private tutor, or at any technical school like the one in Toronto. A practical knowledge of estimating is also absolutely necessary, but this can only be acquired by learning the actual cost of materials and the actual cost of the labor that is required in order to use these materials in a building. You should take a fair supply of building journals in order to keep in touch with current building events and improvements, and should stock your library with a good assortment of standard works on building matters, and above all keep a copy of the "Canadian Contractor's Hand-Book and Estimator" on your desk for daily reference. This work, along with Hodgson's "Estimating Brick and Frame Buildings," will give you an insight as to the proper methods of taking out quantities, and making estimates for all kinds of buildings. Experience alone, however, will be necessary in rounding off your fitness to become a successful contractor.

From "Builder"—I have a segment to lay out, the chord of which is 28 feet, and the rise 3 feet; how can I get the curve without going to a great deal of trouble?

ANS. :—There is no royal way to solving questions of this kind; more or less knowledge of mathematics and geometry in particular is required in matters of this sort. However, here is a method that is about as simple and reliable as can be, and is employed, we believe, in ship building establishments for getting curves in many instances. Lay off the baseline AB, Fig. 3, for instance, 28 feet. At center, C, erect the perpendicular CD, representing the height or spring which, for example, in this case we make 3 feet. From G as center, with CD as radius, describe the arc DE, which divide into three equal parts. Also divide the space GE into three equal parts. Then draw lines cutting the points thus established, as shown in the sketch by 1 2 and 3 4. Divide each half of the baseline AB into three equal parts. Set the bevel to the angles 1 2 C and 3 4 C, and apply as shown at 5 6 C and 7 8 C. Repeat the same operation in the other half of the base. Draw lines 5 6 and 7 8, on which set off respectively the distances 1 2 and 3 4, as shown. Repeat this operation in the opposite half of the figure, then a thin piece of wood, sprung from A to B in such a manner as to touch the points just determined, will give the line of the arch.

From "Contractor"—I have taken a contract to build a stable in which the horses are to be stationed on the second floor, and I would like a little information regarding the concrete or cement floor which I have to put down under the horses feet. Will you kindly give me a few hints on the subject?

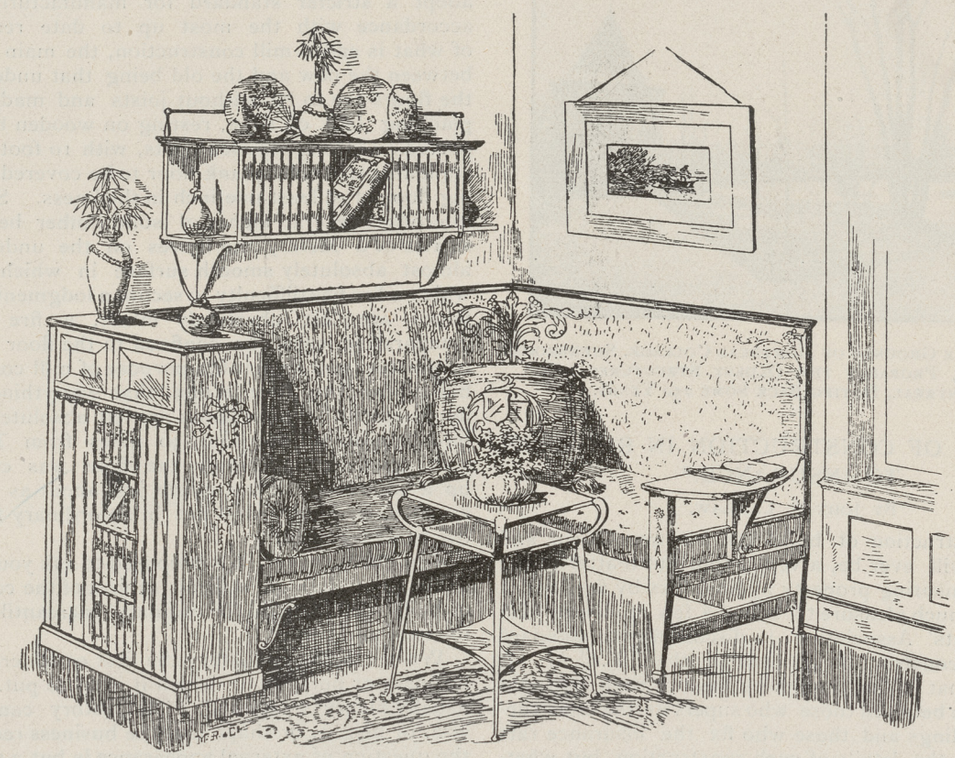


FIG. 2.—A COSEY READING NOOK.

ANS.:—The floor, should, of course, be one slab of cement with the necessary gutters worked in to carry away the water. It should have iron ribs embedded in the correct position to give the greatest tensile strength to the slab, but being completely encased on every side by the concrete of the floors. The thickness of the floor and the weight and section of the iron ribs would be determined by the span, but the quantity, and therefore cost, of the iron would be very much less than the usual quantity and cost of the ordinary and bad system of heavy iron girders, which cut into pieces and reduce the strength of the concrete, and leave iron flanges exposed to the action of rust and fire. The concrete floor, with iron ribs, will be strongest, most fireproof, and dampproof, will have no lateral thrust to be counteracted, as in the case of brick arches and girders, and will also be cheaper. The surface can be finished with a coat of asphalte, paving bricks set in cement or smooth cement. We know of cement stable floors that have resisted the wear of heavy horses for over 15 years without repairs or injury. It is important that the work should be executed by persons thoroughly conversant with the method of construction, and experienced in the selection, treatment, and manipulation of the materials, particularly the cement.

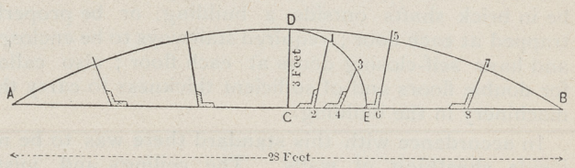
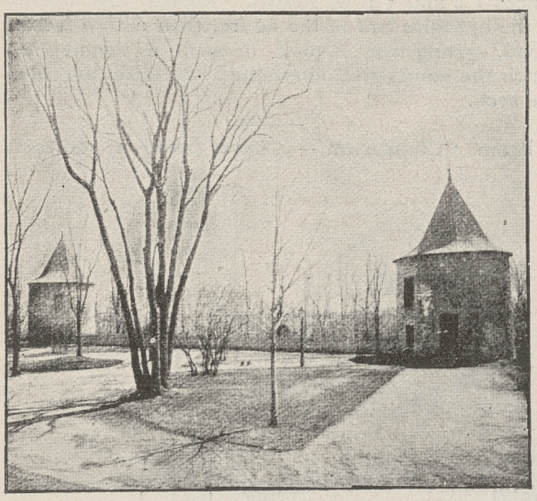


FIG. 3.—SHOWING HOW TO DIVIDE A LARGE SEGMENT OF A CIRCLE.



TOWERS IN THE GROUNDS OF MONTREAL COLLEGE, SHERBROOKE STREET, PROBABLY THE OLDEST STRUCTURES IN MONTREAL, DATING BACK SOME 250 YEARS.

METHODS OF CONSTRUCTION IN RELATION TO INSURANCE.*

BY JOHN B. LAIDLAW.

The construction of buildings has ever been, and doubtless will ever be, a very important matter to the companies insuring property against loss by fire, and it affords me much pleasure to spend a few moments with the Architects' Association in discussing the standard of building construction adopted by the C.F.U.A. It is possible that in the past there has not been sufficient co-operation between those who supervise the construction of buildings and those who fix the insurance rate based upon the details of such construction, but whatever may have been the policy of the underwriters in the past, there is no question that to-day they stand ready to welcome any improvement in building construction and to assist that movement by means of discriminating rates as between buildings constructed according to their standard, and those in disregard of them.

The Underwriters have always recognized some of the essential features of good construction, such as that the walls of the building should be of brick or stone; that roofs should be of incombustible material—but they have only to a limited extent given attention to the interior construction, except as regards buildings to be used as manufactories. For the latter there has been for years a fairly strict standard, which while not requiring a building to be of what is now called mill construction, demanded strong bearing walls ; limited the height and the area of the building ; imposed serious extras in rate if there was a mansard roof ; also required elevators to be in brick shafts outside a building, or be properly trapped at each floor ; required stairways to be enclosed and have self-closing doors at each floor ; also called for double floors and of sufficient thickness to carry the machinery in the building.

In accordance with this standard there was to be no inside sheathing of walls. The ceilings and joists were to be left open, and, speaking generally, an effort was made to avoid any concealed spaces in which dirt could accumulate, and fire not only originate, but be difficult to locate and extinguish.

The standard required the heating and the lighting to be as non-hazardous as possible ; also the boilers for generating steam were to be in an outside separate building.

These were the general requirements, in addition to which there were other special requirements for each individual class of manufactory, such as requiring dry rooms in laundries to be of safe construction ; shaving vaults and dry kilns in connection with woodworking risks to be outside the building; painting and varnishing and upholstering in furniture factories to be in a separate section, and so on throughout the different classes of manufacturing risks.

These requirements have had a marked effect during the last few years in alterations made to old factories and in the erection of new buildings. It is now intended to adopt a stricter standard for manufacturing risks in accordance with the most up to date requirements of what is called mill construction, the main difference between the new and the old being that under the new the floors are to be without joists and made of solid planking laid on edge, resting on wooden beams supported on strong wooden posts, with 10 foot bays as a standard; this solid plank floor to be covered by a wearing floor of at least one inch in thickness. Such a floor interposes several inches of solid timber between the stories of a factory and leaves on the under side an almost absolutely smooth surface in which, or upon which a fire has difficulty to secure a lodgment. If these floors are left absolutely intact, a fire can, with comparative ease, be confined to the floor in which it originates, and such is the purpose of mill construction, but it is well to bear in mind that everything depends upon that "if"—if the floors are left absolutely intact. I have in mind a factory not 50 miles from Toronto of such construction, where the floor was cut to bring up a stairway. They might just about as well have saved their money and put in an ordinary floor for all the benefit gained.

Tonight however, it is proposed to ask your attention to the possibly more difficult subject of the construction of buildings intended for ordinary mercantile purposes in cities and towns.

When building a factory the first consideration is the business or purpose to which it is to be put. There is usually plenty of ground. The factory can be of any size, or height, or shape that the business requires, and the question of external appearance is but a minor one ; when however one comes to consider the construction of a building for mercantile purposes in the heart of a city, say on King, or Yonge, or Queen streets in the centre of Toronto, there are a number of matters which cannot be overlooked, and it is well if any safeguards whatever against fire are introduced. The shape of the lot, the question of light, the business to be carried on, the question of access to the upper floors, must all be considered, and frequently the architect is forced to design a sort of general utility building when the tenant may not have been secured before the work commenced. These conditions have been recognized by the insurance companies and a standard has not been imposed which is too hard, but if anything rather lenient. It does not in any sense call for a fire-proof building, but rather for a well constructed building of joist construction with lath and plaster finish. In such however, there are many hazardous features which the architect can prevent being introduced, which if placed in the building will either induce a fire, or assist to spread it, and so must be charged for by the insurance companies. The standard reads as follows :—

CANADIAN FIRE UNDERWRITERS' ASSOCIATION.

MERCANTILE SCHEDULES.

BUILDING STANDARD.

A standard building is one having walls of brick or stone (brick preferred), not less than twelve inches thick at top storey (16 inches if stone), extending through and 36 inches above roof in parapet and coped, and increasing four inches in thickness for each storey below to the ground—the increased thickness of each storey to be utliized for beam ledges. Ground floor area not over 2,500 square feet (say 25 by 100) ; height not over three stories, or 40 feet ; floors of 2 inch plank, (three inches better) covered by 7/8 or one-inch flooring, crossing diagonally, with waterproof paper or approved fire resisting material between (if tin or sheet iron between, see deductions) ; wooden beams, girders, and wooden storey posts or pillars twelve inches thick, or protected

* Paper read before the Toronto Chapter of the Ontario Association of Architects.

iron columns; elevators, stairways, etc., cut off by brick walls or by plaster on metallic studs and lathing; communications at each floor protected with approved tin-covered doors and fire-proof sills; windows and doors on exposed sides protected by approved tin-covered doors and shutters, or wired glass in metallic frame or a water curtain; walls of flues not less than eight inches in thickness to be lined with fire-brick, well burned clay or cast-iron, and throat capacity not less than 96 square inches if steam boilers are used; all floor timbers to be trimmed at least four inches from outside of flue; heated by hot water or steam; lighted by gas; cornices of incombustible materials; roof of slate, metal, or tile; if partitions are hollow or walls are furred off there must be fire-stops at each floor.

For differences from above the following charges and deductions are made to and from the Key Rate of a town which is determined by the Fire Protection Appliances provided:

WALLS.

INDEPENDENT—Charge for each 4 inches deficiency in average from standard (if building over 4 stories high, double the charge)... .01

On buildings over 3 stories high if average thickness less than 12 inches, add not less than..... .05

If two independent walls adjoin, 4 inches may be deducted from average of these requirements. Charge for one wall only—the most deficient.

A standard independent wall should be 12 inches the top story and increase 4 inches for each story to the bottom. This would require if 3 stories, an average of 16 inches; 4 stories, 18 inches; 5 stories, 20 inches; 6 stories, 22 inches; 7 stories, 24 inches.

PARTY—Charge for each inch deficiency in average from standard (if building over four stories high, double the charge)..... .01

If party wall less than 12 inches thick in any portion, add not less than..... .05

A standard party wall should be 16 inches at the top storey, increasing 4 inches for each storey below. Average required for three storey building, 20 inches; 4 storey, 22 inches; 5 storey, 24 inches; 6 storey, 26 inches; 7 storey, 28 inches, etc.

PARAPET.

Walls not Parapet, each exposed side..... .01

Parapet walls exceeding one foot above roof on all exposed sides, deduct for each foot in excess of one (not exceeding a total of .03)..... .01

Poor bricks or poor quality mortar..... .10

Glass and wood or iron fronts, for each not backed up with bricks and mortar..... .03

Glass and wood for each backed up..... .01

" " for each adjoining in row, in addition to above..... .01

HEIGHT—For fourth story, add..... .05

Fifth story..... .10

Sixth story..... .25

For each story over six, add..... .40

These charges cumulative; for example a six story building would have 40 cents added.

If any story double height, charge for two.

HEIGHT—Two story building, deduct..... .02

One story building, deduct..... .05

STREET.

If street on which building fronts is inaccessible, unpaved, etc., not less than..... .10

(No charge if no fire department, and no charge for side or rear streets).

If less than 60 feet wide, but over 50..... .01

If under 50 feet add for each 5 feet less .01

STREET WIRES.

If to interfere with fire department.....01 to .03

WOODEN CORNICES, CUPOLAS, Dormer Windows or Verandahs.....

Not less than..... .01

CEILING OR SHEATHING.

Wood (natural or painted) or Strawboard Ceiling, 1 story, .03; each additional story charge..... .02

Wood or strawboard siding, 1 story, .03; each additional story charge..... .02

Double each charge if wood be varnished.

If side walls furred and plastered, half charge for wood sheathing.

Cloth or paper ceiling or siding on wooden studs, each story charge..... .10

Metallic studs and lathing throughout, deduct .05

Metallic lathing on wooden studs, deduct... .02

FLOORS.

Tin or sheet-iron between floors, deduct.... .02

Water-proof paper or cement between floors, deduct..... .01

Floors water-proof and also inclined with scuppers to carry off surplus water to sewer, deduct..... .02

If floors exceed two inches in thickness, deduct .01 for each excess inch (in addition to above)..... .01

If grade floor fire-proof..... .10

Each fire-proof floor above grade (not exceeding a total of 25c.)..... .05

No cellar or basement, deduct..... .05

AREA (GROUND FLOOR).

2,500 to 5,000, sq. ft. charge for each 1,000 in excess of 2,500 sq. ft..... .01

5,000 to 10,000, sq. ft. 3 stories, 1,000 in excess of 2,500 sq. ft..... .02

5,000 to 10,000, sq. ft., over 3 stories, 1,000 in excess of 2,500 sq. ft..... .03

10,000 sq. ft. or more, 3 stories, 1,000 in excess of 2,500 sq. ft..... .02½

10,000 sq. feet or more, over 3 stories, not over 6, in excess of 2,500 sq. ft..... .04

(Not exceeding a total of 200 cents).

10,000 sq. ft. and over 6 stories, double the area charge.

(Not exceeding a total of 300 cents).

If building is of standard fire resisting construction throughout, halve the area charge.

On-estory building, one-half the charge for 3 story.

Two-story building, two-thirds the charge for 3 story.

If curtain, cross or division walls, sub-dividing and strengthening the building, even though with arched openings, deduct 10% of area charge for each wall so dividing the risk, not exceeding a total deduction of 40% of the area charge. Communications with adjoining buildings unprotected, charge for area both buildings, and rate as one (allowing for division wall). If fire-doors on communications are not standard, rate as if standard and make an additional charge under "Exposures" for defective doors.

Single Occupancy—If only one tenant outside of dwelling and office tenants twenty per cent. (20%) of the area charge may be deducted.

Small Risks under 1,500 sq. ft. ground floor area and not over 3 stories high, deduct. .05

FRAME REARS—Extensions for each 100 feet wall area, (not more in all than 15c.) charge.. .01

If brick veneered, metal clad, or with openings protected with approved metal covering half charge.

STAIRWAYS.

Enclosed in lath and plaster hallway or provided with automatic trap-doors in floors. .03

Similiar to above with traps closed only at night..... .05

Fire-proof enclosure, but defective doors, etc. .02

Enclosed in wood..... .07

Enclosed in wood with self-closing doors each floor..... .05

Open..... .10

If more than one stairway, charge for worst and add one fourth charge for each additional.

One half charge for stairway if charge for elevator —halve the smaller charge.

If elevator and stairway are contained in the same shaft or opening, only one charge for the two.

No charge for stairways in buildings occupied exclusively for offices and dwellings above first story when stairway does not open into store.

ELEVATORS.

Enclosed in lath and plaster shaft or hallway, or if provided with approved automatic trap doors at floors ..... .05

Fire-proof shaft, but defective doors, or walls not through roof ..... .03

Open ..... .10

Wooden shaft without approved automatic traps ..... .15

One-half above charges for elevators in buildings otherwise standard, or in office building.

If more than one elevator, charge for worst and add one-fourth charge for each additional.

WELL HOLES.

If open, add for each (half charge for approved traps) from ..... .03 .05

CHUTES, VENTS AND DUMB WAITERS.

(Unless fire-proof shaft), and small floor openings—Add for each, (if trapped half charge) ..... .01

SKYLIGHTS.

If of thin glass (less than ¼ inch), in any kind of frame, charge for first 25 feet of total area .02, and for each additional 25 feet of area .0½. If more than one small sky-light charge for each (not more in all than 25c.) ..... .02

If skylight is monitor style, charge for square feet in sides as well as top.

If ¼ inch glass in wooden frames, half charge.

If ¼ inch glass in metal or protected frames, one-fourth charge.

If protected above and below by wire netting, halve the charge.

If wired glass in metal or protected frames, free.

Same charges for floor-lights less than ¾ inch thick.

IRON COLUMNS UNPROTECTED.

Cast Iron .03 ; steel or wrought ..... .05

LIGHTING.

Electricity, approved ..... .02

Any other system for lighting must be subject to approval of Local Board of Underwriters and charged for by rule.

Kerosene (no charge if charged for electricity), not less than ..... .02

Kerosene lighting in hazardous risks, such as paint shops or carpenter shops, not less than ..... .10

HEATING.

If by hot air furnace, not less than ..... .03

Furnace with metallic cold air box, and all vertical hot air pipes, through brick walls and one register fastened open, add ..... .02

Stove (for each additional stove .01). (Must have metal under) ..... .02

Stove in wood working establishments .. .05 .25

Natural gas or oil fuel, approved pressure regulating appliances ..... .05

CHIMNEYS.

Not built from ground, but on brackets, charge for each ..... .05

If inadequate for service required, or walls of flues less than 8 inches thick, unless lined with pipe, not less than ..... .05

If resting on attic floor beams or roof joists, add ..... .25

Poor bricks or mortar ..... .20

Terra-cotta or cement ..... .50

STEAM BOILERS.

(Other than heating). Charge if in basement .05 ; above basement .10 ; wood shavings for fuel 1.00 additional .....

If boiler in fire-proof room cut off in approved manner, no charge.

POWER.

Charge according to hazard .....

ROOF.

Composition and gravel, if not well covered. .02

Shingles (if laid in mortar 5c.) ..... .10

Mansard with wooden frame, 4 story or lower building, for each lineal five feet, but not more than 10c. for one side or 15c. in all ..... .01

Mansard on building 5 stories or more in height, ¼c. additional for each lineal five feet, for each story over four .....

BLIND ATTIC, ROOF SPACE, COCK LOFT.

Take maximum height if slanting roof, and charge for each vertical foot .01, not less than .03 or more than ..... .05

AGE OF BUILDING.

Over twenty years charge ..... .02

OCCUPANCY. .....

.....

.....

.....

Each ordinary mercantile occupancy in excess of one, exclusive of office and dwelling tenants, charge ..... .02

Each hazardous mercantile occupancy, charge .03

Each light manufacturing occupancy, not less than ..... .05

Occupancy exclusively dwelling above grade floor, if one family, deduct ..... .10

(If only one floor so occupied, deduct .05)

Occupancy exclusively dwelling above grade floor if two families, deduct ..... .05

Occupancy if more than two families, deduct Nil.

" if tenement house above grade floor, deduct ..... Nil.

Occupancy if building occupied throughout exclusively for offices or dwelling and offices ..... .15

Occupancy if occupied exclusively above grade floor for offices, or offices and dwelling ..... .05

PROTECTION.

Charge if not within 300 feet of hydrant on 4 in. main circulating or 6 in. main dead end ..... .05

Iron fire escapes outside of building, with landings at each floor, deduct ..... .02

Casks of water or filled pails on each floor (6 filled pails to each 2,500 square feet of floor area), deduct ..... .05

(One-half number may be filled with sand. One cask may be considered the equivalent of three pails.)

Standpipe, internal with tank supply, deduct .02

" " without tank supply, deduct ..... .01

Standpipe, external, with siamese connection for use of fire department, deduct .. .01

Each side or rear accessible to fire department (no deduction for front), deduct ... .02

Fire department house, engine, hose or hook and ladder, within 300 feet .01 ; if next door or on opposite side of street deduct .02

Basement and sub-cellar perforated pipe sprinklers, deduct ..... .02

Automatic sprinklers in basement, (no deduction if allowance has been made for sprinklers throughout building) ..... .05

Roof hydrants if protected from freezing ... .02

Floor beams and girders self-releasing .... .01

Auxiliary private fire plant, force pump, etc. .05
Watchman, with portable clock..... .05
" with electric detector..... .10

EXPOSURES. To be charged by inspectors according to circumstances.

CONFLAGRATION HAZARD. Charge for such when conditions require.

ADD FOR FAULTS OF MANAGEMENT, EASILY CORRECTED.

140 If stovepipes through floors or partition, not protected, .50; through window, roof or wall, with double metal chimney, .50; not protected, 1.00; entering bottom of flue vertically, .25; entering flue in attic or unused room, etc..... .25
140a Floor beneath stove not protected.... .05
141 Bottom of elevator shaft used for closets, etc., or waste..... .50
142 Swinging gas brackets or bracket lamps unprotected, for one .05, each additional one..... .01
143 Untidiness, rubbish, ashes, etc., especially in cellar or attic, .25; packing material not in bins..... .15
144 Cracked or bulged walls, thin and worn floors, broken plastering, broken windows, etc.....10 to .25
145 Empty boxes, rubbish, etc., in rear yard, alleys, window recesses, under sidewalk, gratings, etc..... .10
146 Open lights in show windows or electric bulbs covered with tissue paper or paper shades..... .25
147 Sawdust on floors, sawdust spitoons, etc. .25
148 Kerosene used to sprinkle floors..... .25
149 Ash and waste cans, not metal..... .10
150 Furnace top within 4 inches of wooden beams or ceilings, if brick; or within 12 inches if portable, with metallic shield .10 to .25
151 Fire-places, hearths on wooden beams, or floors within 16 inches of fire-place; or wooden fire-boards, or summer pieces, or unprotected wooden mantels, or open stovepipe holes.....05 to .25
152 Steampipes in contact with wood, not less than..... .01
153 Elevator or other shafts communicating with roof space..... .25
154 Electric lighting or other system, with installation not in compliance with underwriters' rules; or arc lights unprotected by tight globes or metal screens..... .25
154a Crowded merchandise without proper aisles, opposite or too near windows, overloading, not less than..... .25

Now if you will allow me I will take up each feature in detail.

First—the walls. It is necessay to have a solid wall, not only to sustain whatever weight the building may, during changes of occupancy, be called upon to bear, but also to stand firm and keep out a fire which may burn the neighboring premises. We therefore ask that the side walls shall rise above the roof three feet, as a parapet over which the flames will have difficulty in leaping. We sometimes find that a wall is carried up three feet above the roof but the cornice is run continuously along the front from one building to another. The cornice should be cut as well as the roof.

We call for increasing thickness of walls as the building increases in height, and that the ledges formed by the increase in thickness shall bear the floor joists. This is very important as we are constantly finding that the practice of inserting joists in the walls by leaving out a couple of bricks, not only conveys fire through the walls should the adjoining building burn, but also when a serious fire occurs in the supposed building under consideration, the falling of the floors brings the walls down, causing a total loss to it and to its contents, and also lets the fire through into the next building.

Party walls require to be four inches thicker than independent walls, the reason for which I am sure will be apparent to every architect. There are many party walls erected in which the joists have only four inches of brick between their ends, and in some cases the joists actually meet and overlap. Such walls are hardly worthy of the name.

The schedule imposes an extra charge on the building if a large amount of the front is of glass or wood, and the charges for exposure to a building so constructed, are also increased.

Our standard calls for a building of moderate height; if that height is increased, extra charges are imposed.

There is a small charge for wooden cornices on building, but such increase the charge for exposure from the adjacent buildings and should be avoided as much possible.

The standard ceiling is plaster upon wooden lath, or a ceiling of metal. There is of course no objection if an old ceiling of plaster upon lath, is covered with metal.

Wood for sheathing of walls or ceilings is decidedly objected to, and still more so if the wood be varnished, the charges in that case being doubled. With wood at its present price there is no economy in using such inflammable material for partitions or ceilings, and the insurance companies hope that such will soon be a thing of the past. If metallic lath is used throughout the building instead of the ordinary wooden laths, a reduction is allowed.

The standard calls for floors to be three inches in in thickness. If they are thicker than that, an increased deduction is allowed for each inch in excess. It is recognized that there are very few floors that exceed two inches in thickness, and so in applying the charges, there is a deduction allowed for every inch in excess of two inches.

Then again, if the floors are double and if they have metal between, or if the floors are made water-proof, and drained to carry off any water thrown upon them, or if the floors are made fire-proof, that is, of steel and concrete construction, with the steel properly protected by metal lath and plaster, or porous tile, deductions are allowed.

If the area exceeds the standard, there are extra charges, but even in this case if there are numerous brick walls sub-dividing the building, the area charge is reduced. It is very difficult to locate a fire which may originate in a building of large area, as the smoke at once fills the whole building and when the firemen arrive they waste a large amount of precious time in endeavoring to get at the exact spot where the stock or building is burning.

When the Murray store burned, the building was filled with smoke and the firemen could not see what they were doing; they found after they had been working for two hours that they were throwing the water against a brick wall, the fire being on the other side of it. This does not happen in a small store, or one which is divided into sections.

Now let us suppose that a building has been constructed with solid walls, with double floors, that metallic lathing has been used throughout the building, and what has been gained if numerous openings from floor are introduced?

I would like to draw your attention to Robert Simpson's building on the corner of Queen and Yonge streets, one of the best examples of fire proof construction in the city. In it there is an immense light well from cellar to roof. There are also openings from floor to floor for stairways and elevators. A fire starting in that building would have every opportunity to spread from cellar to roof in an incredibly short time, and if such did happen it would be found that the fire-proof building was nothing more than an immense stove in which the contents would be speedily and completely consumed, although the building itself might remain comparatively unhurt. Were it not for the introduction of automatic sprinklers such a risk would probably not be insured for less than 5% per annum,

and even at that rate the insurance secured would in all probability be but a fraction of the value.

The insurance companies recognize the difficulty of providing an absolute cut-off between floors in a mercantile building, but such is possible, either by having a fire-proof elevator and stairway annex cut off from each floor by fire-proof revolving doors, or if the elevators and stairways must be in the building, then in a shaft walled in by metallic lath and plaster, and (or) wired glass. Well holes or light wells can also be closed by wired glass either perpendicularly around the shaft, or horizontally at the floor line, or better still, construct the building so as not to require such at all. If elevators and stairways are introduced, the companies must charge for them, the charges being so fixed that even if the owner cannot entirely remove the hazard, that the companies will make some allowance for a partial protection.

In this connection let me give you an illustration. If a property owner were to erect six stores alongside of one another, each, one story high, with a brick wall in rear and in front and at each end, but with only lath and plaster partitions between each store, everyone passing would say ; that is a shell ; that is no better than a frame building ; that is a fire trap. But if we can imagine the supposed property owner turning the supposed block of stores upon end so that the first store to the left is the first storey of the new building which is six stories high, and if the supposed property owner immediately starts to make openings between each of the lath and plaster partitions, inserting stairways from floor to floor, and also introducing an elevator from cellar to garret, the passer-by looks and says, that is a splendid building.

We require that skylights be of wired glass in metal frame, and where so built there is no charge. A skylight of thin glass in wooden frame is a conflagration breeder. It not only assists a fire inside but invites the outsider to come in.

Heating by hot air furnaces and by stoves has cost the companies a tidy sum and such is charged for.

Chimneys should not be placed on brackets. Such is a dangerous expedient ; if it must be resorted to, a charge must be imposed.

The mansard roof is an undesirable style which is rapidly disappearing. Where such is constructed it necessarily means that a large amount of wooden material is placed in the most dangerous position in the building—hardest to reach should a fire occur, and the point to which all flames naturally go whenever a fire breaks out. Such a roof either entails the destruction of the building or a very serious loss, owing to the amount of water required to extinguish a fire in it.

Many buildings are constructed with blind attics. Such should be avoided wherever possible ; particularly should great care be taken that there is no opening from an elevator shaft into a blind attic. Such condition is frequently found and is exceedingly careless and dangerous.

A good many buildings are still roofed with shingles. It is hoped that the architects of Toronto will use their influence to discontinue the use of this most dangerous roof covering. Numerous conflagrations can be traced to the fact that the buildings had shingle roofs. Such not only burn rapidly themselves, but set fire to others, and after a fire has been burning a short time, the shingles will rise from the roof and fly like birds to a considerable distance.

If internal protection against fire is provided, there is an allowance made, particularly for casks and pails, which any workman or even child, knows how to use, but the companies place their chief reliance on the speedy arrival of the fire brigade, and also that the construction of the building is such that the fire will not have been able to gain undue headway before the brigade arrives. If the building is constructed with open elevators, open stairways, or open well holes, a fire will spread with great rapidity from cellar to roof, and by the time the brigade will have reached the scene, the flames will probably be breaking out of every window and cannot be stopped by any brigade short of almost a total loss. If the elevator had been trapped, the stairway or well hole closed, the fire would probably be still burning upon the floor in which it originated, and the firemen would have a fair chance to extinguish it.

It may be of interest to the architects to know that the Mercantile Schedule which we are to discuss this evening, is based on a schedule compiled a few years ago by a large committee composed of the leading underwriters in the Eastern States, who after more than two years of conference and committee work, published the Universal Mercantile Schedule. I have a copy of this schedule here and can procure others if your members desire to have them for reference.

This work is the basis of the schedule we have adopted in Canada. It will I think repay any time an architect may devote to its study, and I take the liberty of commending it to you to-night.

I may also point out that the schedule referred to has not as yet been put in force in Toronto, and may not be for a few months or even a year. Anyone however, who is about to build would be wise to comply with the requirements of the standard.

The schedule recognizes that a building may be well constructed and still be used in a careless and dangerous manner, and so there are charges for "Faults of Management," such as unprotected stove pipes through floors or partitions—unprotected floors under stoves—bottom of elevator shaft used as a waste dump—swinging gas brackets—badly placed heating furnaces, and dangerous fire places.

The last charge for crowding and overloading the building will, I am sure, appeal to all here as a direct incentive to tear down and build greater.

I am afraid you are all weary of this subject, which I regret I am not able to make as interesting as a critical dissertation on the colonial style or some other one equally fashionable, but I am nearly through now and merely wish to direct your attention to some features of our charges for exposures.

A study of conflagrations in cities shows that they are generally caused by unprotected openings in adjacent walls, a fire being enabled by such to spread quickly to several adjacent buildings and soon provide the brigade with a job quite too large for their fire-fighting equipment. Care should therefore be taken by the architect to guard against this danger, and when there must be numerous window openings in a wall facing another similiar wall a few feet distant, that such are protected by outside shutters of wood covered on both sides with metal, or have a metallic frame and wired glass in each exposed window, or provide a water curtain. Also if possible, avoid having the windows in one wall directly opposite the windows of the other. This can often be easily arranged.

Do not cut off a one storey section by a solid wall on the ground floor and leave several windows in the higher building looking down upon the roof of the lower one. Avoid heavy wooden cornices, and if there must be an overhanging eave, see that it is covered with metal. In Montreal a very popular form of roof is centre drained, such not requiring any projecting eave. Also avoid breaking division walls between buildings. It is astonishing to what an extent this practice has grown, until we sometimes find that in as many as ten adjoining buildings there is not one party wall absolutely intact.

If party or division walls must be cut, then be careful to leave no wood about the opening, which should be arched and provided with a sill of stone or concrete, while the door to close the opening should be really and truly standard—such, properly hung on an incline are less in the way, and less unsightly than the old hinged door.

The insurance companies in adopting this standard, hope that it will induce more careful planning, more solid construction, fewer fires, and lower rates. The standard should be of service to the up-to-date architect and we hope it will be freely used by you all in persuading the property owner that good construction and good returns go hand in hand.

THE NOVA SCOTIA FREESTONES.

The changing fashions in stone used for building purposes in all the large cities of America have called out many comments, not alone from practical stone men, but also from general writers who are impressed by the varying effects of city architecture. The brownstone fronts of New York, which formerly lined street after street, with their stately, if sombre facades, figure in every description of the city. As the brownstone yielded place to other materials, every visitor to the city felt called upon to record the change. About a generation ago one stone, although in several colors, was largely used in New York and in all of the leading eastern cities. It has everything to commend it; beauty of color, fineness of texture, ease of working and durability. But its reign was comparatively brief. After a few years of high favor, it passed almost wholly out of the market and now scarcely a foot of it is used in New York and but very little in any of the American cities. Perhaps one reason for this is that it was not an American stone and that our architects and builders thought that they should give the preference to a native product. This was the Nova Scotia freestone. The buildings in which it was used that are still standing afford striking testimony of its excellent quality. About 1865 Mr. Charles D. Archibald furnished the Nova Scotia sandstone in what is known as the olive color for the wall around Central Park. This stone came from the Mary's Point quarry in New Brunswick. Stone in a wall like this in such an exposed position does not have the protection from the weather that is afforded by a building, but this has lasted admirably and few freestones would have endured as well.

About three or four years later one of the first building jobs in the Nova Scotia stone was the Dry Dock Savings Bank on Fourth Avenue, which is still standing. This stone was furnished by the late G. P. Sherwood from the "Budro" quarry on the Petit-Codiac river in New Brunswick. Mr. Sherwood also furnished the stone for the old Hanover bank building, on the corner of Pine and Nassau streets, recently torn down to make room for the new twenty-two story structure of pink Milford granite. When the old building was destroyed it was seen that the stone had weathered perfectly, that every arris was as sharp as when originally cut and that the carved work still bore the mark of the chisel. Many other important buildings were erected of this stone, among them being the block at the corner of Forty-fifth street and Sixth avenue, from the Sherwood quarries, and the Sloane building on Broadway, of brownstone from Mary's Point.

In the New England cities the Nova Scotia freestone was held in still higher favor and its general use by the architects and builders continued for an even longer time. Among the notable structures in Boston which made use of either the russet or olive stone were the Fifty Associates building on New Washington street, the Harvard buildings on Arch street, the Boylston Bank building, the Young Men's Christian Union on Boylston street, the Columbus Hotel, Parker Memorial Hotel, Hotel Commonwealth, Dr. Lothrop's church, Providence and Lowell depots, the Catholic Cathedral on Washington street, and Prof. Agassiz's Museum, besides many imposing blocks of dwellings and business houses.

Although there has ceased to be any considerable market for this stone in the States, it is in good demand throughout Canada. There is every reason for this aside from mere local pride. Some of the quarries have been worked for a great many years, but the amount of high-grade stone that is still available is unlimited. In a few places quarrying is conducted at a disadvantage. On the River John and the River Philip, most of the quarries are below the river level. The method of working them is to build a dyke or dam along the shore, pump out the water within and then open a quarry. The objection to this method is that it is impossible to keep the water out at all times and it is well known that salt water has a very deleterious effect on sandstone. It frequently causes it to scale or chip and at the best it almost certainly leads to efflorescence. So general is this fact recognized that when the stone used to be shipped to the States on barges the dealers insisted upon its being stowed in the hold and would not purchase it if it made the sea voyage on the decks. At Wallace Harbor the quarries are admirable, having level beds capable of furnishing fine platforms. The stone is overlaid with from 12 to 20 feet of stiff clay. This is a peculiar formation and has almost a leathery toughness. It has to be removed with a pick. At Kennetcook is found a dark brown and an olive and a blue grit, the latter of which is used for grindstones. A cargo of this grit was sent a number of years ago to the water shops at Manchester and other place in Great Britain, and the workmen declared it made the finest grindstones they had ever used. For some reason no great industry was ever built up at this place. Manuidie was also another place that was famous for its grindstones and scythe stones. These deposits were worked for many years by the Seaman Brothers, whose name was known throughout the world.—Stone.

THE BUILDERS' FOREMAN AND CLERK OF WORKS.

At a recent annual dinner of the Provident Institution of Builders' Foremen and Clerks of Works of Great Britain, the chairman, Mr. F. Higgs, thus described the qualifications of a successful builders' foreman and clerk of works—"Every good foreman should be careful, accurate and shrewd, and should have patience, forbearance and tact, personal magnetism, organizing power, fidelity to duty—in fact, character. The Clerk of Works should be honest in purpose and action, disinterested, fair and unbiased in judgment, open-minded for new methods and ideas, not wanting in a due sense of proportion and able to see two sides to a question. The ideal foreman and clerk of works did not quarrel, but pulled together, for though there might be two ways of looking at a work, it must not be forgotten that there was only that one work."

—THE—

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Contributions of value to the persons in whose interest this journal is published are cordially invited. Subscribers are also requested to forward newspaper clippings or written items of interest from their respective localities.

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NOTES.

It is stated that during one month recently, nearly 100,000 tons of iron and steel material were imported through the three ports of New York, Philadelphia and Baltimore. The shipment included pig iron, steel billets, steel and iron rails, structural steel and wire rods, and plate bars. The immediate demand for such products is so great that the domestic plants, extensive as they are, cannot meet it.

MEN WHO BUILD A SKY-SCRAPER.

According to the Architects' and Builders' Journal the following staff is employed in the erection of a modern sky scraper :—

Laborers	300
Carpenters	100
Concrete layers	30
Riggers and riveters	150
Stone-masons	15
Tile layers	30
Electricians	30
Plumbers	20
Bricklayers	20
Plasterers	50
Marble workers	20
Housesmiths	25
Painters	25
Steam-fitters	25
Roofers	30
Sheet-metal workers	20
Elevator workers	30
Boiler and engine erectors	30
Mail-chute workers	10
Stationary engineers and firemen	10
Total	970

PERSONAL.

A partnership has recently been formed between Messrs. G. W. Grant and A. E. Henderson, architects, of Vancouver, B. C.

Mr. L. Feystore, builder, and a resident of Toronto for thirty years, died in that city recently following an operation for appendicitis.

Mr. Silas E. Hoidge, a well-known and highly respected builder of Toronto, died in that city last month as the result of a fall from a building on which he was working at Toronto Junction.

Acknowledgement should have been made in our March issue to the publishers of La Presse, Montreal, to whose courtesy we are indebted for the use of the plate from which was printed the illustration of the Polytechnic School.

The Building Contractors' Council, of Chicago, have determined to sign no agreements with Unions that do not contain a clause prohibiting sympathetic strikes, limitation of amount of work a workman may perform in a day, or that do not permi the unlimited use of machinery, the employment of apprentices, and the right to employ or discharge any workman at pleasure.

ADVERTISING VALUE.

It is very well for some men to say they believe in advertising, and to expect a liberal return from their investment merely as a reward for their faith in the value of publicity. It is quite another thing to get value out of the space used. The belief in advertising is natural since advertising has done much for many establishments and individuals, but it will not do much unless much is put into the advertising. The real secret about business is business, and the real worth of advertising depends on business also. It is necessary to put common or uncommon business judgment into the space used for the benefit of the business and to make the establishment, the goods and the methods stand out before the possible customer in a light which will be pleasing and help the public in general to understand the worth of the stock. There are those who talk ethical advertising and ideal publicity to an extent that they really believe in it themselves, but will be disappointed in results unless they get something into that advertising which will give it vitality. It is useless to expect to impress a public with the standing of a firm as an up-to-date business combination unless there be life in the advertisement. The message must show the strength of the merchant behind it and must demonstrate the merits of the place. The point is the life and character of the announcement. Make it stand out in every line and make it so conspicuous that any possible buyer will see it and appreciate it.—Advertising World.

NOTES.

At Upleatham, North Yorkshire, is said to be the smallest church in England. Its size is 17′ 9″ x 13′. The building which is 900 years old, is now used as a cemetery chapel.

An International exhibition of building materials and methods has been arranged for at Paris this year. The date of opening has not yet been announced. Great Britain, Germany and Belgium will be well represented. A leading feature of the British and Belgian exhibits will be plans for low cost dwellings.

Upwards of twenty committees and subcommittees composed of persons prominently identified with the iron and steel industries of Great Britain have been engaged for a considerable time on the work of standardizing structural iron and steel sections, equal, unequal, and bulb angles, bulb tees and plates, H beams, Z and T bars, channels and beams. Thirty sections of H beams are given, varying from 3in. by 1½in. to 24in. by 7½in., and weighing respectively from 4 lbs. to 100 lbs. per ft. The Engineering Standards Committee states that beams ordered to the standard thickness shall be practically accurate in profile; but if the thickness of the web is less or greater than these standards, the width of the section will be decreased or increased by the same amount; and it is suggested that beams be ordered by depth of section, width of flanges, and weight per foot. It is claimed that the standardization of sections will effect a saving of several million pounds annually.

William Clendenning writes in "Fireproof" on the subject of "Misplaced Fire Escapes." He states that hundreds of fire escapes in our principal cities follow window lines vertically, from top to bottom, thus exposing them directly to the action of fire when it bursts from the windows at each floor, rendering the escapes unsafe and unfit for the exit of any human being, because they become red-hot in many cases, thus making them death-traps rather than fire escapes. In the course of a single street car ride in Chicago the author says he counted on one side of the street sixty-five fire escapes so located as to be utterly useless in cases of fire on either side of the lower stories. The remedy for this alarming state of affairs is to place the fire escapes at or near a corner, or at least removed from immediate proximity to windows, with platforms communicating at each floor, and so give the tenant a chance for his life. This subject is probably new to most people and should be looked into by building inspectors. A fire escape placed in front of a row of windows should be condemned and the owner required to remove it to a comparatively safe position.

John Mackay & Coy., of The Canadian Bank of Commerce Building, Toronto, would like to be placed in communication with a firm of architects of the highest professional standing, and of special experience in the erection of modern Bakeries. Communications will be held in the strictest confidence.

BRITISH BRICK STANDARDS.

As a result of many conferences between committees of the Royal Institute of British Architects and the British Institute of Clayworkers, the following standards for bricks and brickwork have been agreed upon :

1. The length of the brick should be double the width plus the thickness of one vertical joint.

2. Brickwork should measure four courses of bricks and four joints to a foot.

Joints should be ¼in. thick and an extra ⅛, making ⅜ for the bed joints to cover irregularities in the bricks. This gives a standard length of 9¼in. centre to centre of joints.

The bricks to be measured in the following manner :

(a) Eight stretchers laid square end and splay end in contact in a straight line to measure 72 in.

(b) Eight headers laid side to side frog upwards in a straight line to measure 35 in.

(c) Eight bricks, the first brick frog downwards and then alternately frog to frog and back to back, to measure 21 in.

A margin of one inch less to be allowed as to (a), and ½in. less as to (b) and (c).

This is to apply to all classes of walling bricks both machine and hand-made.

Ten pictures, the gift of the Industrial Exhibition Association, have recently been added to the nucleus of a collection which in the future will adorn the walls of the Municipal Buildings at Toronto.

PORTLAND CEMENT AFFECTED BY TIME.

A correspondent signing himself "Architect" writes as follows to the London Building News :—Have you or any of your readers found that Portland cement in course of time occasionally acts curiously and in a manner which I do not pretend to account for? It will remain dormant for say, five, ten, or even twenty years, and then become active to this extent, that mosaic flooring and the like will come away from its screeding, and plastering will lose its key from walls built in cement, so that when you tap the surface of the walling the plaster sounds hollow, just as the flooring does. I do not refer to blowing of cement improperly mixed. The action I speak of does not refer to any changed or fresh conditions. The cement gradually appears to become deteriorated till at last it becomes sufficiently disintegrated to have lost its rigid cohesive strength. This condition is to be observed in high-class work. How is this, and what steps can be taken to obviate ?

BUSINESS NOTE.

Architects, builders, painters and others who may require information about any kind of glass will find much to interest and instruct them in the comprehensive new catalogue issued by the Toronto Plate Glass Importing Company. Each of the ten sections into which the catalague is divided refers to one particular kind of glass, and in addition there is a general index. Besides prices and particulars of the many varieties of glass kept in stock by the company, the catalogue contains much useful data relating to methods of manufacture, the principles of the diffusion of light, etc. The book is bound in strong, flexible linen covers, and will be sent free to any of our readers who may write for a copy mentioning the CANADIAN ARCHITECT AND BUILDER.

The announcement has been made that Professor S.H. Capper, M.A., who for several years has been at the head of the Department of Architecture of McGill University at Montreal, has accepted the position of Professor for the newly Constituted Chair of Architecture, Manchester. It is expected that Professor Capper will return to England and begin the duties connected with the Manchester Chair of Architecture next autumn.

British Trade Supplement

The Publishers of **"The Canadian Architect and Builder"** have arranged to furnish information respecting British Exporters of Building Materials and their goods advertised in this paper, and will keep on file at their Offices, Imperial Building, Montreal, and Confederation Life Building, Toronto, **Catalogues, Price Lists, Etc.**

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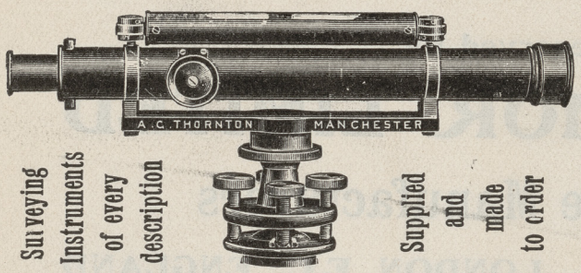

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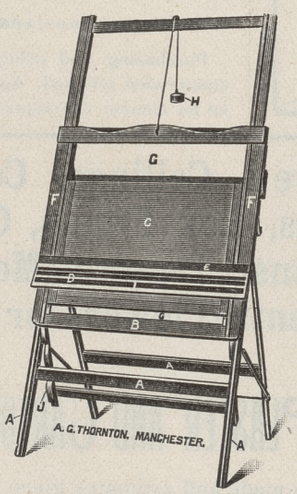

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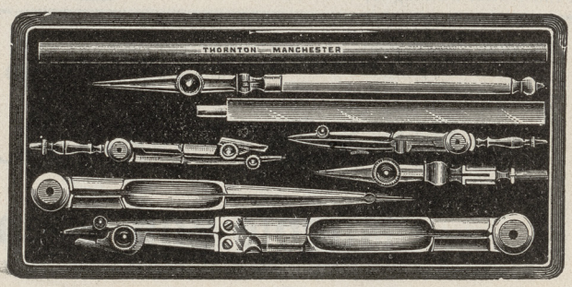

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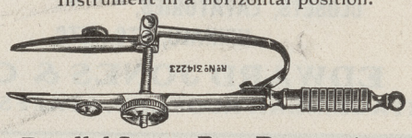

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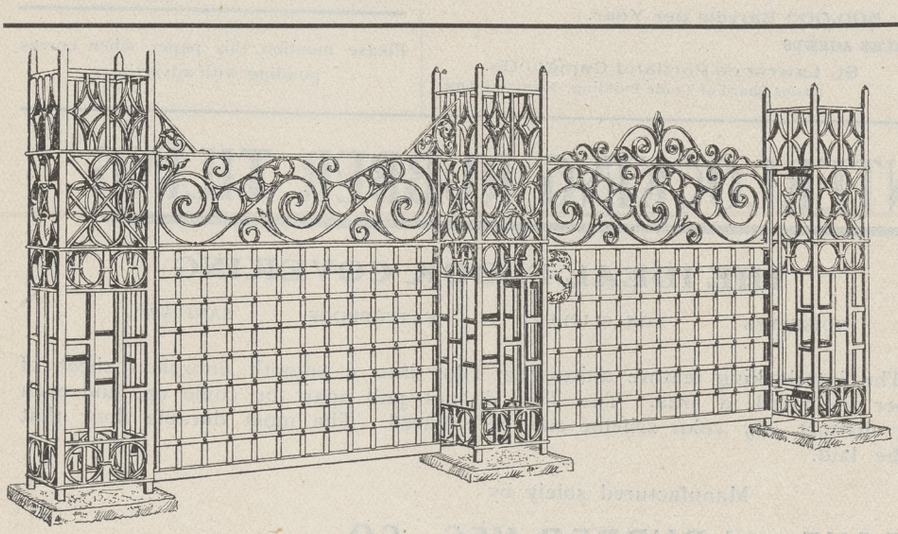

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